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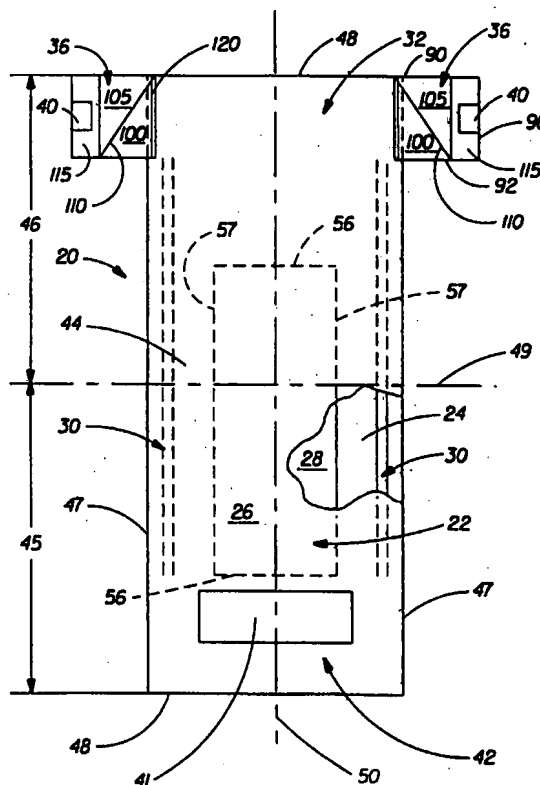
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: ABSORBENT ARTICLE WITH SIDE PANELS HAVING ZONES OF DIFFERENT EXTENSIBILITY

## (57) Abstract

Absorbent articles such as disposable diapers, incontinence briefs, diaper holders, training pants, feminine hygiene garments and the like, that have a unique side panel which improves the overall fit of the absorbent article as well as reducing the redmarking of the wearer's skin. Such absorbent articles include a chassis assembly preferably having a liquid pervious topsheet, a liquid impervious backsheet joined to the topsheet, and an absorbent core positioned between the topsheet and the backsheet; a pair of side panels joined to the chassis assembly; and a closure system for maintaining the absorbent article on the wearer. The side panels have a low extension force leg zone and a high extension force waist zone.



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## ABSORBENT ARTICLE WITH SIDE PANELS HAVING ZONES OF DIFFERENT EXTENSIBILITY

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**FIELD OF THE INVENTION**

The present invention relates to absorbent articles such as diapers, incontinence briefs, training pants, and the like, and more particularly, to absorbent articles having a multi-zoned side panel providing improved fit about the wearer as well as improved comfort for the wearer.

**BACKGROUND OF THE INVENTION**

Infants and other incontinent individuals wear absorbent articles such as diapers to receive and contain urine and other body exudates. Absorbent articles function both to contain the discharged materials and to isolate these materials from the body of the wearer and from the wearer's garments and bed clothing. Disposable absorbent articles having many different basic designs are known to the art. For example, U.S. Patent Re. 26,152, entitled "Disposable Diaper" issued to Duncan and Baker on January 31, 1967, describes a disposable diaper which has achieved wide acceptance and commercial success. U.S. Patent 3,860,003, entitled "Contractable Side Portions For Disposable Diaper", issued to Buell on January 14, 1975, describes an elasticized leg cuff disposable diaper which has achieved wide acceptance and commercial success.

Disposable diapers with side stretch features have used stretch and force profiles that are compromise solutions to good initial fit, good sustained fit, and low degrees of redmarking of the wearer's skin. The need for compromise solutions is the result of a design flaw in current stretch diapers. The design flaw is the use of a diaper-to-stretch feature bond or connection that is parallel to the longitudinal edges or machine direction edges of the diaper. The bond extending parallel to the longitudinal edges of the diaper causes forces to be very similar or equal along the stretch panel from top to bottom when the diaper is applied on a wearer. The equal forces result in either redmarking of the skin at the top of the leg, poor sustained fit about the waist, or both.

Therefore, it is an object of the present invention to provide a disposable absorbent article such as a disposable diaper having improved initial fit, improved sustained fit, and reduced redmarking of the wearer's skin.

It is a further object of the present invention to provide an absorbent article having a unique side panel feature.

These and other objects of the present invention will be more readily apparent when considered in reference to the following description and when taken in conjunction with the accompanying drawings.

### **SUMMARY OF THE INVENTION**

The present invention provides absorbent articles such as disposable diapers, incontinence briefs, diaper holders, training pants, feminine hygiene garments and the like, that have a side panel that improves the initial fit and the sustained fit of the absorbent article on the wearer and a reduced redmarking of the wearer's skin. Such absorbent articles comprise a chassis assembly having end edges and longitudinal edges. The chassis assembly preferably comprises a liquid pervious topsheet, a liquid impervious backsheet joined with the topsheet, and an absorbent core positioned between the topsheet and the backsheet; a pair of side panels joined with the chassis assembly, the side panels extending laterally outwardly beyond the longitudinal edges of the chassis; and a closure system for maintaining the absorbent article on the wearer.

The side panels comprise a leg zone and a waist zone. The leg zone has an extension force which is less than the extension force of the waist zone. The lower extension force leg zone allows the side panels to easily expand with the leg movements of the wearer thereby reducing any redmarking of the skin around the leg region. The higher extension force waist zone generates a continuous ring of tension about the wearer's waist providing improved initial and sustained fit.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as forming the present invention, it is believed that the invention will be better understood from the following description which is taken in conjunction with the accompanying drawings in which like designations are used to designate substantially identical elements, and in which:

Figure 1 is a plan view of a disposable diaper embodiment of the present invention having portions cut-away to reveal underlying structure, the outer surface of the diaper facing the viewer;

Figure 2 is a fragmentary plan view of an alternative embodiment of a side panel of the present invention;

Figure 3 is a fragmentary plan view of an alternative embodiment of a side panel of the present invention;

Figure 4 is a fragmentary plan view of an alternative embodiment of a side panel of the present invention; and

5 Figure 5 is a fragmentary plan view of an alternative embodiment of a side panel of the present invention.

### **DETAILED DESCRIPTION OF THE INVENTION**

As used herein, the term "absorbent article" refers to devices which absorb and  
10 contain body exudates, and, more specifically, refers to devices which are placed against or in proximity to the body of the wearer to absorb and contain the various exudates discharged from the body. The term "disposable" is used herein to describe absorbent articles which are not intended to be laundered or otherwise restored or reused as an absorbent article (i.e., they are intended to be discarded after a single  
15 use and, preferably, to be recycled, composted or otherwise disposed of in an environmentally compatible manner). A "unitary" absorbent article refers to absorbent articles which are formed of separate parts united together to form a coordinated entity so that they do not require separate manipulative parts like a separate holder and liner. A preferred embodiment of an absorbent article of the  
20 present invention is the unitary disposable absorbent article, diaper 20, shown in Figure 1. As used herein, the term "diaper" refers to an absorbent article generally worn by infants and incontinent persons that is worn about the lower torso of the wearer. It should be understood, however, that the present invention is also applicable to other absorbent articles such as incontinence briefs, training pants,  
25 feminine hygiene garments, and the like.

Figure 1 is a plan view of the diaper 20 of the present invention in its flat-out, uncontracted state (i.e., with elastic induced contraction pulled out) with portions of the structure being cut-away to more clearly show the construction of the diaper 20 and with the portion of the diaper 20 which faces away from the wearer, the outer  
30 surface, facing the viewer. As shown in Figure 1, the diaper 20 has a generally "T-shape" and comprises a chassis assembly 22 preferably comprising a liquid pervious topsheet 24, a liquid impervious backsheet 26 joined with the topsheet 24, an absorbent core 28 positioned between the topsheet 24 and the backsheet 26; extensible leg cuffs 30; an extensible back waist feature 32; a pair of side panels 36;  
35 a closure system for fastening the diaper on the wearer preferably comprising at least a pair of fastening members 40 and a landing member 41; and an extensible front waist feature 42.

The diaper 20 of Figure 1 has an inner surface (not shown), an outer surface 44 (facing the viewer in Figure 1) opposed to the inner surface, a front waist region 45, a back waist region 46 opposed to the front waist region 45, and a periphery which is defined by the outer edges of the diaper 20 in which the longitudinal edges are designated 47 and the end edges are designated 48. (While the skilled artisan will recognize that a diaper is usually described in terms of having a pair of waist regions and a crotch region between the waist regions; in this application, for simplicity of terminology, the diaper 20 is described as having only waist regions, each of the waist regions including a portion of the diaper which would typically be designated as part of the crotch region). The inner surface of the diaper 20 comprises that portion of the diaper 20 which is positioned adjacent to the wearer's body during use (i.e., the inner surface generally is formed by at least a portion of the topsheet 24 and other components joined to the topsheet 24). The outer surface 44 comprises that portion of the diaper 20 which is positioned away from the wearer's body (i.e., the outer surface 44 generally is formed by at least a portion of the backsheet 26 and other components joined to the backsheet 26). The front waist region 45 and the back waist region 46 extend, respectively, from the end edges 48 of the periphery to the lateral centerline 49 of the diaper 20. (The lateral direction (x direction or width) is defined as the direction parallel to the lateral centerline 49 of the diaper 20; the longitudinal direction (y direction or length) being defined as the direction parallel to the longitudinal centerline 50; and the axial direction (Z direction or thickness) being defined as the direction extending through the thickness of the diaper 20.)

Figure 1 shows a preferred embodiment of the diaper 20 in which the topsheet 24 and the backsheet 26 have length and width dimensions generally larger than those of the absorbent core 28. The topsheet 24 and the backsheet 26 extend beyond the edges of the absorbent core 28 to form portions of the periphery of the diaper. The periphery defines the outer perimeter or, in other words, the edges of the diaper 20. The periphery comprises the longitudinal edges 47 and the end edges 48.

The chassis assembly 22 (chassis panel) of the diaper 20 is shown in Figure 1 as comprising the main body (chassis) of the diaper 20. The chassis assembly 22 comprises at least an absorbent core 28, preferably an outer covering layer comprising the topsheet 24 and the backsheet 26. Thus, the chassis assembly 22 comprises the main structure of the diaper with other features added to form the composite diaper structure. An exemplary example of a chassis assembly of the present invention is described in U.S. Patent 3,860,003 issued to Kenneth B. Buell on January 14, 1975, which patent is incorporated herein by reference.

The absorbent core 28 may be any absorbent means which is capable of absorbing and retaining liquids such as urine and other certain body exudates. The absorbent core 28 has a garment surface, a body surface, side edges 57, and waist or end edges 56. The absorbent core 28 may be manufactured in a wide variety of sizes and shapes (e.g., rectangular, hourglass, "T"-shaped, asymmetric, etc.) and from a wide variety of liquid-absorbent materials commonly used in disposable diapers and other absorbent articles such as comminuted wood pulp which is generally referred to as airfelt. Examples of other suitable absorbent materials include creped cellulose wadding, meltblown polymers including coform, cross-linked cellulose fibers, tissue including tissue wraps and tissue laminates, absorbent foams, absorbent sponges, superabsorbent polymers, absorbent gelling materials, or any equivalent material or combinations of materials. The configuration and construction of the absorbent core may also be varied (e.g., the absorbent core may have varying caliper zones, a hydrophilic gradient, a superabsorbent gradient, or lower average density and lower average basis weight acquisition zones; or may comprise one or more layers or structures). The total absorbent capacity of the absorbent core 28 should, however, be compatible with the design loading and the intended use of the diaper 20. Further, the size and absorbent capacity of the absorbent core 28 may be varied to accommodate wearers ranging from infants through adults. Figure 1 shows a preferred embodiment of the diaper 20 having a rectangular-shape absorbent core.

An absorbent structure useful as the absorbent core 28 of the present invention that has achieved wide acceptance and commercial success is described in U.S. Patent 4,610,678 entitled "High-Density Absorbent Structures" issued to Weisman and Goldman on September 9, 1986. U.S. Patent 4,673,402 entitled "Absorbent Articles With Dual-Layered Cores" issued to Weisman, Houghton, and Gellert on June 16, 1987; U.S. Patent 4,888,231 entitled "Absorbent Core Having A Dusting Layer" issued to Angstadt on December 19, 1989; U.S. Patent 5,147,345 entitled "High Efficiency Absorbent Articles For Incontinence Management", issued to Young, LaVon & Taylor on September 15, 1992; U.S. Patent 5,102,597 entitled "Porous, Absorbent, Polymeric Macrostructures and Methods Of Making the Same", issued to Roe, Lahrman and Berg on April 7, 1992; and U.S. Patent 4,834,735, entitled "High Density Absorbent Members Having Lower Density and Lower Basis Weight Acquisition Zones", issued to Alemany and Berg on May 30, 1989; also describe absorbent structures that are useful in the present invention. The absorbent core 28 is preferably the dual-layer absorbent structure described in U.S. Patent 5,234,423 entitled "Absorbent Article With Elastic Waist Feature and Enhanced

Absorbency", issued to Alemany and Clear on August 10, 1993. Each of these patents are incorporated herein by reference.

The backsheet 26 is positioned adjacent the garment surface of the absorbent core 28 and is preferably joined thereto by attachment means (not shown) such as those well known in the art. For example, the backsheet 26 may be secured to the absorbent core 28 by a uniform continuous layer of adhesive, a patterned layer of adhesive, or an array of separate lines, spirals, or spots of adhesive. Adhesives which have been found to be satisfactory are manufactured by H. B. Fuller Company of St. Paul, Minnesota and marketed as HL-1258. The attachment means will preferably comprise an open pattern network of filaments of adhesive as is disclosed in U.S. Patent 4,573,986 entitled "Disposable Waste-Containment Garment", which issued to Minetola and Tucker on March 4, 1986, and which is incorporated herein by reference. An exemplary attachment means of an open pattern network of filaments comprises several lines of adhesive filaments swirled into a spiral pattern such as is illustrated by the apparatus and methods shown in U.S. Patent 3,911,173 issued to Sprague, Jr. on October 7, 1975; U.S. Patent 4,785,996 issued to Ziecker, et al. on November 22, 1978; and U.S. Patent 4,842,666 issued to Werenicz on June 27, 1989. Each of these patents are incorporated herein by reference. Alternatively, the attachment means may comprise heat bonds, pressure bonds, heat/pressure bonds, ultrasonic bonds, dynamic mechanical bonds, or any other suitable attachment means or combinations of these attachment means as are known in the art.

The backsheet 26 is impervious to liquids (e.g., urine) and is preferably manufactured from a thin plastic film, although other flexible liquid impervious materials may also be used. As used herein, the term "flexible" refers to materials which are compliant and will readily conform to the general shape and contours of the human body. The backsheet 26 prevents the exudates absorbed and contained in the absorbent core 28 from wetting articles which contact the diaper 20 such as bedsheets and undergarments. The backsheet 26 may thus comprise a woven or nonwoven material, polymeric films such as thermoplastic films of polyethylene or polypropylene, or composite materials such as a film-coated nonwoven material. Preferably, the backsheet is a thermoplastic film having a thickness of from about 0.012 mm (0.5 mil) to about 0.051 mm (2.0 mils).

Further, the backsheet may permit vapors to escape from the absorbent core (i.e., breathable while still preventing exudates from passing through the backsheet).

The topsheet 24 is positioned adjacent the body surface of the absorbent core 28 and is preferably joined thereto and to the backsheet 26 by attachment means (not



shown) such as those well known in the art. Suitable attachment means are described with respect to joining the backsheet 26 to the absorbent core 28. As used herein, the term "joined" encompasses configurations whereby an element is directly secured to the other element by affixing the element directly to the other element, and configurations whereby the element is indirectly secured to the other element by affixing the element to an intermediate member(s) which in turn is affixed to the other element. In a preferred embodiment of the present invention, the topsheet 24 and the backsheet 26 are joined directly to each other in the diaper periphery and are indirectly joined together by directly joining them to the absorbent core 28 by the attachment means (not shown).

The topsheet 24 is compliant, soft feeling, and non-irritating to the wearer's skin. Further, the topsheet 24 is liquid pervious permitting liquids (e.g., urine) to readily penetrate through its thickness. A suitable topsheet may be manufactured from a wide range of materials, such as porous foams; reticulated foams; apertured plastic films; or woven or nonwoven webs of natural fibers (e.g., wood or cotton fibers), synthetic fibers (e.g., polyester or polypropylene fibers), or a combination of natural and synthetic fibers. Preferably, the topsheet 24 is made of a hydrophobic material to isolate the wearer's skin from liquids which have passed through the topsheet and are contained in the absorbent core 28 (i.e., to prevent rewet). If the topsheet is made of a hydrophobic material, at least the upper surface thereof is treated to be hydrophilic so that liquids will transfer through the topsheet more rapidly. This diminishes the likelihood that body exudates will flow off the topsheet rather than being drawn through the topsheet and being absorbed by the absorbent core. The topsheet can be rendered hydrophilic by treating it with a surfactant. Suitable methods for treating the topsheet with a surfactant include spraying the material with the surfactant and immersing the material in the surfactant. A more detailed discussion of such a treatment and hydrophilicity is contained in U.S. Patent 4,988,344 entitled "Absorbent Articles With Multiple Layer Absorbent Layers" issued to Reising, et al. on January 29, 1991.

There are a number of manufacturing techniques which may be used to manufacture the topsheet 24. For example, the topsheet 24 may be a nonwoven web of fibers. When the topsheet comprises a nonwoven web, the web may be spunbonded, carded, wet-laid, meltblown, hydroentangled, combinations of the above, or the like. A preferred topsheet is carded and thermally bonded by means well known to those skilled in the fabrics art. A preferred topsheet comprises staple length polypropylene fibers having a denier of about 2.2. As used herein, the term "staple length fibers" refers to those fibers having a length of at least about 15.9 mm

(0.625 inches). Preferably, the topsheet has a basis weight from about 18 to about 25 grams per square meter.

The diaper 20 preferably further comprises extensible leg cuffs 30 for providing improved containment of liquids and other body exudates. Each extensible leg cuff 30 may comprise several different embodiments for reducing the leakage of body exudates in the leg regions. (The leg cuff can be and is sometimes also referred to as leg bands, leg flaps, barrier cuffs, or elastic cuffs.) U.S. Patent 3,860,003 entitled "Contractable Side Portions For a Disposable Diaper" issued to Buell on January 14, 1975, describes a disposable diaper which provides a contractible leg opening having a leg flap and one or more elastic members to provide an elasticized leg cuff (gasketing cuff). U.S. Patent 4,909,803 entitled "Disposable Absorbent Article Having Elasticized Flaps" issued to Aziz & Blaney on March 20, 1990, describes a disposable diaper having "stand-up" elasticized flaps (barrier cuffs) to improve the containment of the leg regions. U.S. Patent 4,695,278 entitled "Absorbent Article Having Dual Cuffs" issued to Lawson on September 22, 1987, describes a disposable diaper having dual cuffs including a gasketing cuff and a barrier cuff. U.S. Patent 4,704,115 entitled "Disposable Waste Containment Garment" issued to Buell on November 3, 1987, discloses a disposable diaper or incontinent garment having side-edge-leakage-guard gutters configured to contain free liquids within the garment. U.S. Patent 5,032,120 entitled "Disposable Absorbent Article Having Improved Leg Cuffs" issued to Freeland & Allen on July 16, 1991, discloses an absorbent article having leg cuffs having a relatively low ultimate contact force at relatively high elongations accomplished, for example, by low contact force differential material. U.S. Patent 5,087,255 entitled "Absorbent Article Having Inflected Barrier Cuffs" issued to Sims on February 11, 1992, discloses an absorbent article having inflected barrier cuffs with the distal edge positioned outboard of the proximal edge in one waist region and inboard in the other to provide better fit about the hips/buttocks. Each of these patents are incorporated herein by reference.

The diaper 20 further comprises extensible waist features that provide improved fit and containment. The extensible waist features at least extend longitudinally outwardly from the chassis assembly, preferably a respective waist edge of the absorbent core 28, and generally form at least a portion of the end edge of the diaper 20. Thus, in the embodiment shown in Figure 1, the extensible back waist feature 32 comprises that portion of the diaper 20 extending from the waist edge 56 of the absorbent core 28 in the back waist region 46 to the end edge 48 of the diaper 20. The waist feature can be constructed as a separate element joined to

the chassis assembly 22 or as an extension of other elements of the diaper (i.e., unitary). Preferably, the waist feature is constructed as an extension of other elements of the chassis such as the backsheet 26, the topsheet 24, or both.

5 The extensible back waist feature 32 provides an extensible member that provides a more comfortable and contouring fit by initially conformably fitting the diaper to the wearer and sustaining this fit throughout the time of wear well past when the diaper has been loaded with exudates since the extensible back waist feature allows the diaper to expand and, preferably, to contract. Further, the extensible back waist feature develops and maintains wearing forces (tensions) that  
10 enhance the tensions developed and maintained by the closure system to maintain the diaper on the wearer and that enhance the fit of the diaper about the waist of the wearer. The extensible back waist feature further provides more effective application of the diaper since even if the diaperer pulls one side (side panel 36) of the extensible back waist feature farther than the other during application  
15 (asymmetrically), the diaper will "self-adjust" during wear.

The extensible back waist feature 32 may be constructed in a number of configurations and from a number of different materials. For example, the extensible back waist feature 32 may be elasticized by operatively joining an elastic member thereto such as the elasticized waistbands known in the art and as are  
20 disclosed in U.S. Patent 4,515,595 issued to Kievit, et al. on May 7, 1985; and U.S. Patent 5,151,092 issued to Buell, et al. on September 29, 1992; each of which are incorporated herein by reference. Thus, the extensible back waist feature may be a stretch laminate such as a zero strain stretch laminate as is described in U.S. 5,151,092 Buell, et al. In a preferred embodiment of the present invention, the  
25 extensible back waist feature comprises a structural elastic-like film SELF web as described in U.S. Pat. No. 5,518,801 issued to Chappell et al. in May 21, 1996, which is incorporated herein by reference.

In the embodiment shown in Fig. 1, the side panels 36 are joined to the chassis assembly 22 such that they extend laterally outwardly from the longitudinal edges  
30 47. The side panels 36 may have a number of different sizes and shapes. In the preferred embodiment shown in Figure 1, the side panels 36 have a rectangular shape. For a typical "large" (8 kg to 14 kg) baby diaper, the side panels may, for example, have a size of about 63 mm in the lateral direction by about 80 mm in the longitudinal direction.

35 The side panels 36 may be constructed in a number of configurations and from a number of different materials. The side panels may comprise conventional elastic materials or mechanically stretched laminates such as a zero strain stretch laminate.

In a preferred embodiment of the present invention, the side panels comprise a SELF web as described in the aforementioned U.S. Pat. No. 5,518,801 issued to Chappell et al.

The side panels 36 may comprise a separate element affixed to the chassis assembly 22, or can be constructed as an extension of other elements of the diaper such as the backsheet 26 or the topsheet 24, preferably both the topsheet and the backsheet. In the embodiment of the present invention shown in Figure 1, the side panels 36 each comprise a separate web joined to the chassis assembly 22. The side panels 36 are joined to the chassis assembly 22 in the back waist region 46 and extend laterally outwardly beyond the longitudinal edges 47. The side panels 36 comprise a first end edge 90, positioned adjacent and forming a portion of the end edge 48 of the chassis assembly, a second end edge 92 positioned away from the first end edge 90 towards the lateral centerline 49, a first longitudinal edge 94, and a second longitudinal edge 96 positioned laterally outwardly from the longitudinal edge 47 of the chassis assembly 22. The first longitudinal edge 94 may be contiguous with the longitudinal edge 47, preferably the first longitudinal edge 94 is positioned laterally inwardly of the longitudinal edge 47.

The side panels 36 have a multiple zone construction comprising at least a leg zone 100 and a waist zone 105. The leg zone 100 is positioned adjacent to the longitudinal edge 47 of the chassis assembly 22. The waist zone 105 is positioned laterally outwardly from the leg zone 100. The leg zone 100 is extensible in a direction having a vector component in the lateral direction, preferably in the lateral direction. The waist zone 105 is extensible in a direction having a vector component in the lateral direction, preferably the lateral direction. The leg zone 100 is designed to have lower extension forces than the waist zone 105. The extension force of the leg zone 100 should be as low as possible. In a preferred embodiment, the extension force of the leg zone 100 is less than about 10 gm/cm, preferably less than about 5 gm/cm, at 50% extension. The extension force of the waist zone is preferably between about 10 gm/cm to 30 gm/cm, preferably between about 15 gm/cm and 20 gm/cm, at 50% extension.

In the embodiment shown in Fig. 1, the leg zone 100 is separated from the waist zone 105 by a separation zone 110. The separation zone 110 may be a line of demarcation distinguishing the leg zone 100 from the waist zone 105. Preferably, the separation zone 110 is a nonextensible zone which physically separates the leg zone 100 from the waist zone 105. The nonextensible separation zone 110 is preferably formed with the use of heat/pressure bonds, ultrasonic bonding or mechanical bonding which bonds the various layers of the side panels together in

such a way to render them nonextensible. The separation zone 110 may also be formed by joining additional materials to the side panel to render that portion nonextensible.

In the embodiment shown in Figure 1, the leg zone 100, the waist zone 105, the separation zone 110, and the grasping zone 115 each comprise the same material. However, each zone has its own unique degree of force/extension. The use of a SELF web such as described in the aforementioned U.S. Pat. No. 5,518,801 issued to Chappell et al. allows the force/extension properties of each zone to be specifically designed.

The leg zone 100 may have a number of different sizes and shapes. In the preferred embodiment shown in Figure 1, the leg zone 100 have a triangular shape. A side of the triangle forms a portion of the second end edge 92. the waist zone 105 may also have a number of different sizes and shapes. Preferably, the waist zone 105 has a triangular shape with a side of the triangle having a portion of the first end edge 90.

The leg zone 100 having the low force and unique triangular shape allows the side panel to expand with the leg movement of the wearer at relatively low forces. This provides the benefit of reduced redmarking of the wearer's skin since less force lower tensions are riding along the leg of the wearer. The waist zone 105 maintains a continuous ring of high force in the waist area of the diaper which provides improved initial and sustained fit. This high force zone extends across the end edge 48 of the diaper providing the ring of tension necessary to initially fit and sustain this fit through use.

As shown in Figure 1, the leg zone 100 preferably forms no portion of the first end edge 90 of the side panel 36. Preferably, the waist zone 105 forms no portion of the second end edge 92 of the side panel 36. Referring now to Figure 5, there is shown an alternative embodiment of the side panel 436 of the present invention. Side panel 436 comprises a leg zone 500, a waist zone 505 and a separation zone 510. The leg zone 500 forms a portion of both the first end edge 490 and the second end edge 492. The waist zone 505 forms a portion of both the first end edge 490 and the second end edge 492. Alternatively, the side panel 436 may be designed such that the leg zone 500 forms a portion of both the first end edge 490 and the second end edge 492 while the waist zone 505 forms a portion of the first end edge 490 but forms no portion of the second end edge 492. Alternatively, the side panel 436 may be designed such that the waist zone 505 forms a portion of both the first end edge 490 and the second end edge 492 while the leg zone 500 forms a portion of the second end edge 492 but forms no portion of the first end edge 490.

The side panels 36 may be joined to the chassis assembly 22 in a number of different ways as are known in the art including by adhesives, heat/pressure bonds, ultrasonic bonding, or mechanical bonding. Side panels 36 are preferably bonded to the chassis 22 via mechanical bonding indicated as 120 in Figure 1.

5 Referring to Figure 1, the side panels 36 preferably comprise a grasping region 115 disposed laterally outwardly from the waist zone 105. The grasping zone 115 is preferably a stiff material which is nonextensible and functions to allow for convenient grasping of the side panel 36 by the user to apply the fastening members 40 to the landing zone 41.

10 As shown in Figure 1, the diaper 20 may also be provided with an extensible front waist feature 42. The extensible front waist feature 42 is designed to fit around the abdomen in the front waist of the wearer to improve the fit and containment of the diaper at the front waist. The extensible front waist feature 42 extends longitudinally outwardly from the chassis assembly 22, preferably the waist edge 56  
15 of the absorbent core 28, and generally forms at least a portion of the end edge 48 of the diaper 20 in the front waist region 45. The extensible front waist feature 42 may comprise any of the known configurations of an elastic feature or any of the extensible features as described herein. For example, the extensible front waist feature may comprise any of the elasticized waistbands as are known in the art such  
20 as are disclosed in the above-referenced U.S. Patent 4,515,595 (Kievit, et al.) and U.S. Patent 5,151,092 (Buell, et al.). Further, the extensible front waist feature may comprise a stretch laminate such as a zero strain stretch laminate as is described in U.S. Patent 5,151,092 (Buell, et al.).

The diaper 20 is also provided with a closure system for fitting the diaper on  
25 the wearer. While the closure system may take on a number of configurations such as adhesive tape tabs, mechanical closure tape tabs, fixed position fasteners, side seams as for training pants, or any other closure means as are known in the art; as shown in Figure 1, the closure system preferably comprises an adhesive tape tab fastening system including a pair of tape tab fastening members 40 and a landing  
30 member, preferably a reinforcing strip 41 as in Figure 1 or, the alternative, a portion of the backsheet, positioned in the front waist region 45 of the diaper 20. Examples of suitable adhesive tape tab fastening systems are disclosed in U.S. Patent 3,848,594 issued to Buell on November 19, 1974; and U.S. Patent 4,662,875 issued to Hirotsu and Robertson on May 5, 1987; each of which are incorporated herein by  
35 reference. Examples of other closure systems, including mechanical closure systems, useful in the present invention, are disclosed in U.S. Patent 4,869,724 issued to Scripps on September 26, 1989; U.S. Patent 4,848,815 issued to Scripps on

July 11, 1989; and the two-point fastening system described in U.S. Patent 5,242,436 issued to Weil, Buell, Clear, and Falcone on September 7, 1993; each of which are incorporated herein by reference.

The diaper 20 is preferably applied to a wearer by positioning the back waist region 46 under the wearer's back and drawing the remainder of the diaper between the wearer's legs so that the front waist region 45 is positioned across the front of the wearer. The tab portions of the tape tabs 40 are then released from the release portion. The diaperer then wraps the side panel 36 around the wearer, while still grasping the tab portion. The side panel will typically be extended and tensioned during this operation so as to conform to the size and shape of the wearer. The tape tab 40 is secured to the reinforcing strip 41, the landing member, on the chassis assembly 22 to effect a side closure. The process is then repeated with the other tape tab. Thus, the diaper is closed on the wearer and the extensible back waist feature and the other elements, if provided, provide the fit and containment benefits as described herein. Alternatively, the diaper may be fastened prior to being fitted on the wearer such that it may be used as a pant. In either configuration, the pant or diaper may be removed by disengaging the fasteners or removing it as one would a pant.

Figure 2 shows an alternative embodiment of a side panel 136 of the present invention. Side panel 136 is a separate member joined to the chassis assembly 22. The side panels 136 extends laterally outwardly beyond the longitudinal edge 147 of the chassis assembly 122. The side panel 136 comprises a leg zone 200, a waist zone 205, and a separation zone 210. The fastening member is joined to the waist zone as the side panel 136 does not include a grasping zone. The leg zone 200 has a triangular shape where a side of the triangle forms a substantial portion of the second end edge 192. The waist zone 205 has a triangular shape where a side of the triangle forms a substantial portion of the first end edge 190. The side panel is joined to the chassis assembly 122 such that it is spaced away from the end edge 148 of the chassis assembly 122. The first end edge 190 is spaced away from the end edge 148 a distance indicated as 160. Distance 160 is less than about 2 cm, preferably less than about 1 cm. The first end edge 190 of the side panel 136 forms a portion of the end edge of the chassis assembly 122.

Figure 3 shows an alternative embodiment of a side panel 236 of the present invention. The side panel 236 is a separate member joined to the chassis assembly 222. The side panel 236 is a separate member joined to the chassis assembly 222. The side panel 236 extends laterally outwardly beyond the longitudinal edge 247 of the chassis assembly 222. The side panel 236 comprises a leg zone 300, a waist

zone 305, a separation zone 310, and a grasping zone 315. The grasping zone 315 and the separation zone 310 are preferably nonextensible zones. The fastening member 240 preferably comprises a mechanical closure member. Mechanical closure members may comprise any well known means for achieving a closure by  
5 mechanical engagement such as hook and loop fastening materials. When the fastening member comprises a mechanical closure member, the landing members (not shown in Figure 3) comprises a complementary mechanical closure element which is engageable with the fastening member 240.

Figure 4 shows an alternative embodiment of a side panel 336 of the present  
10 invention. Side panel 336 is an extension of the backsheet 326 and the topsheet (not shown) with other elements, such as elastic members, joined thereto, preferably between the topsheet and backsheet. The side panel 336 comprises a leg zone 400, a waist zone 405, a separate zone 410, and a grasping zone 415. In the embodiment of Figure 4, the first end edge 390 is contiguous with the end edge 348 of the chassis  
15 assembly 322 such that it forms a continuous edge across the back waist region. The second end edge 392 is non-parallel to the first end edge 390. The first end edge 390 extends parallel to the lateral centerline of the diaper while the second end edge 392 extends at an angle to the lateral centerline. A line 370 defines the boundary between the side panel 336 and the chassis assembly 322. In this embodiment the  
20 line 370 is an extension of the longitudinal edges 347 of the chassis assembly 322. However, line 370 may be positioned laterally inwardly or laterally outwardly from the longitudinal edge 347.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other  
25 changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.



**WHAT IS CLAIMED IS:**

1. A disposable absorbent article having a front waist region and a back waist region, the absorbent article comprising a chassis assembly having end edges and longitudinal edges, said chassis assembly comprising a liquid pervious topsheet, a liquid impervious backsheet joined with said topsheet, and an absorbent core positioned between said topsheet and said backsheet; characterized by said chassis assembly including:  
  
a pair of side panels joined with said chassis assembly, said side panels extending laterally outwardly beyond said longitudinal edges, each said side panel having a leg zone and a waist zone, the leg zone having an extension force less than the waist zone.
2. The absorbent article of Claim 1 wherein said side panels each comprise a structural elastic-like film web.
3. The absorbent article of either Claim 1 or Claim 2 wherein said waist zone is extensible in the lateral direction.
4. The absorbent article of any one of the preceding claims wherein said leg zone is extensible in the lateral direction.
5. The absorbent article of any one of the preceding claims wherein said leg zone has an extension force between about 2 gm/cm and about 10 gm/cm at 50% extension.
6. The absorbent article of any one of the preceding claims wherein said waist zone has an extension force between about 10 gm/cm and about 30 gm/cm at 50% extension.
7. The absorbent article of any one of the preceding claims additionally comprising a separation zone separating said leg zone from said waist zone.

8. The absorbent article of Claim 7 wherein said separation zone is nonextensible.
9. The absorbent article of any one of the preceding claims additionally comprising a substantially nonextensible grasping zone disposed laterally outwardly from said waist zone.
10. The absorbent article of Claim 1 wherein said leg zone and said waist zone each have a triangular shape.

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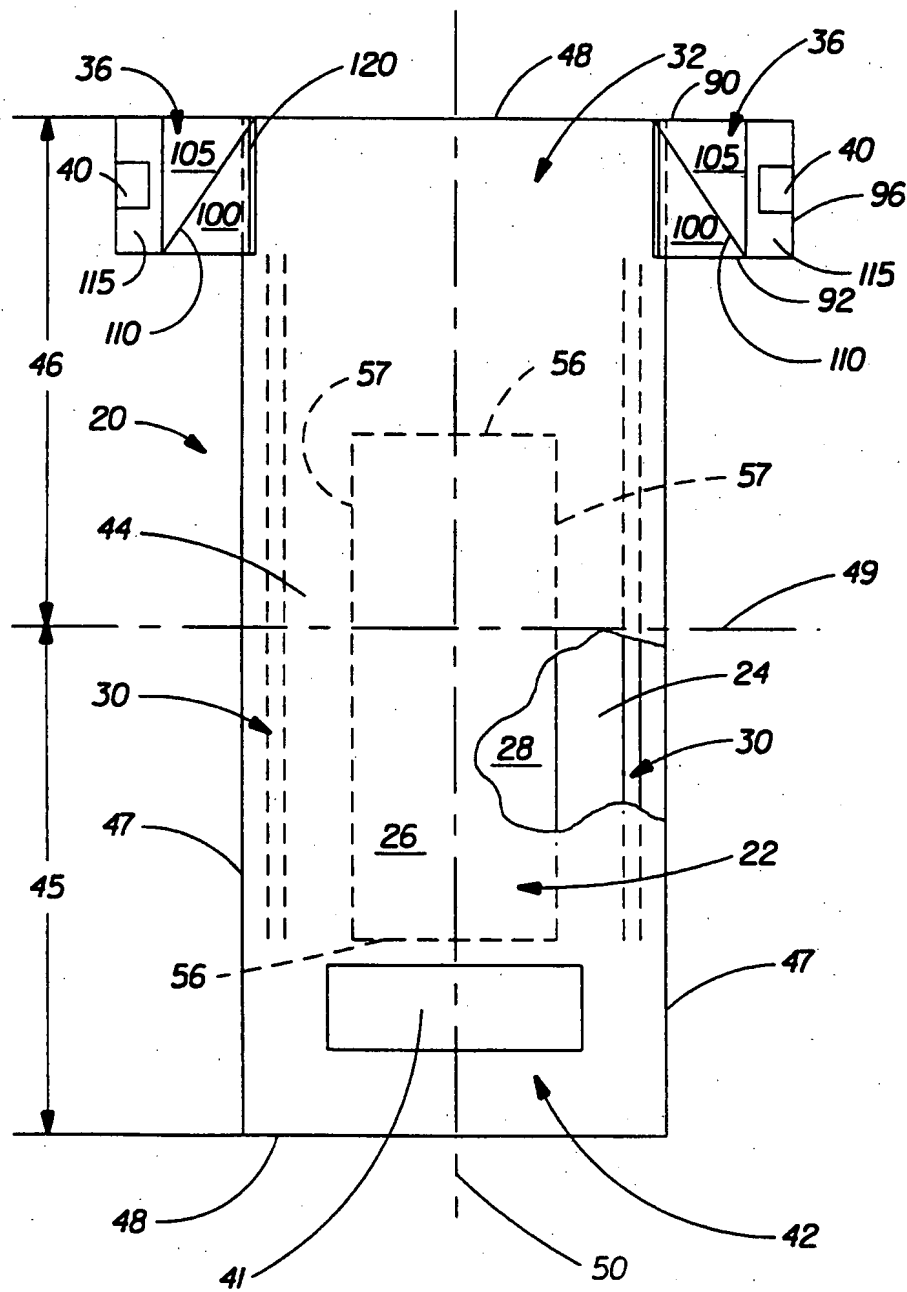


FIG.1

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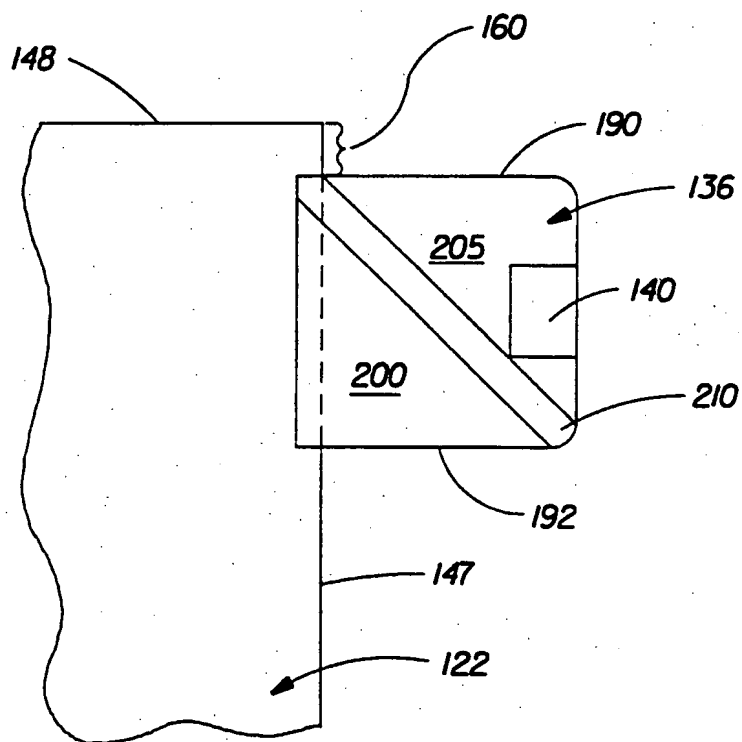
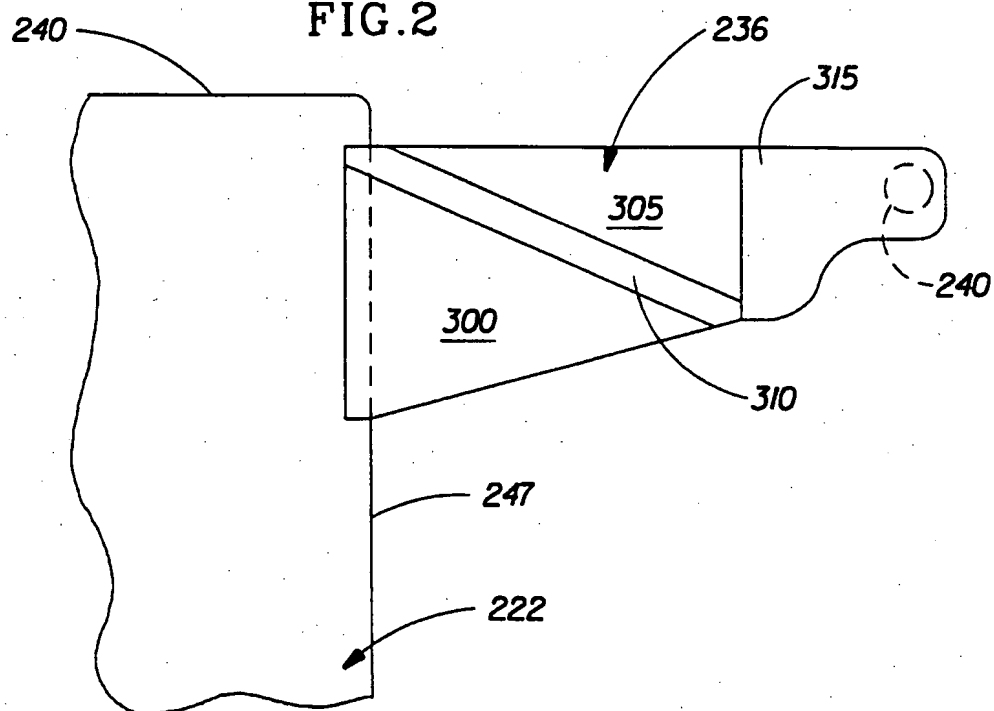


FIG.2



**FIG.3**

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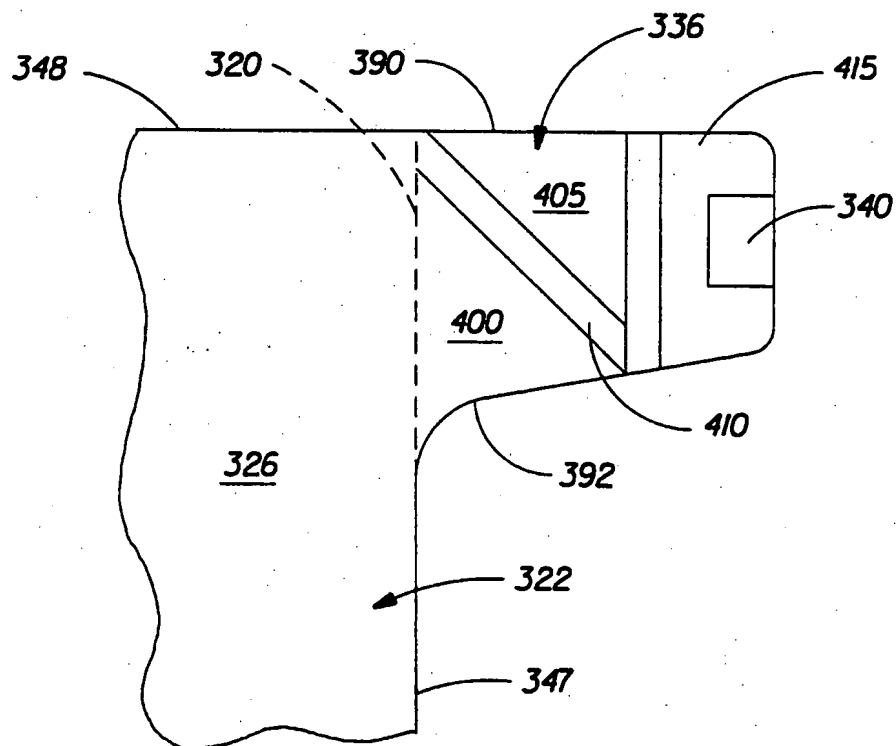


FIG. 4

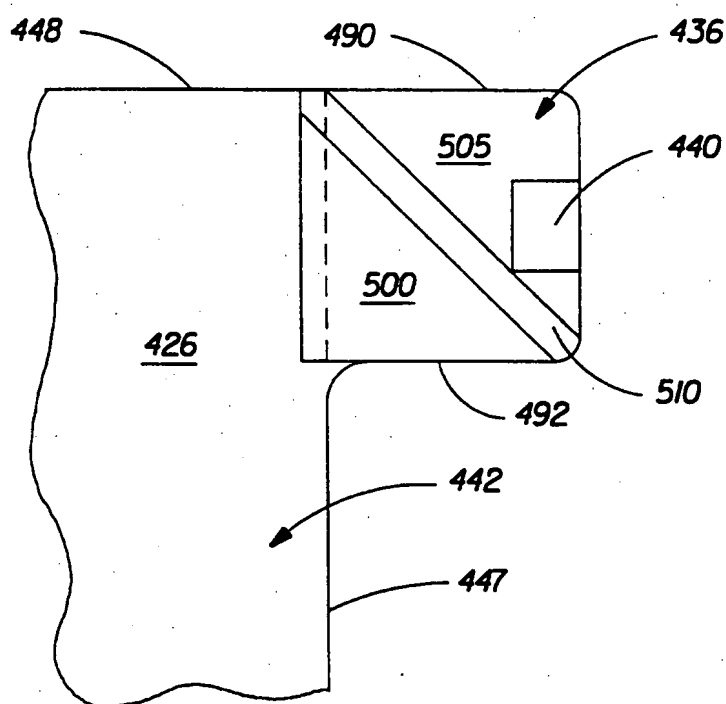


FIG. 5

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 98/00852

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A61F13/15

According to International Patent Classification(IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 547 497 A (KIMBERLY CLARK CO) 23 June 1993 see column 2, line 2 - line 15 see column 4, line 16 - line 22 see column 5, line 40 - column 6, line 26 see column 7, line 21 - line 28; claims 1,2,7,8,12; figure 1 ----	1,4,10
X	WO 92 22274 A (PROCTER & GAMBLE) 23 December 1992 see page 4, line 26 - page 5, line 26 see page 38, line 15 - page 39, line 12 see page 51, line 5 - line 12 see page 52, line 16 - line 32 see page 56, line 4 - page 57, line 11; claims 1,6,7; figure 1 ----- -/--	1,3,4

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 98/00852

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 95 19753 A (PROCTER & GAMBLE) 27 July 1995 see page 11, line 6 - line 9; claims 1,6,7; figures see page 23, line 5 - line 21 see page 24, line 17 - page 25, line 32 ---	1-4
Y	EP 0 487 921 A (KAO CORP) 3 June 1992 see claims 6-8; figures ---	1-4
A	EP 0 761 194 A (UNI CHARM CORP) 12 March 1997 see column 3, line 16 - line 32; figure 3 ---	1,3,4,7,8
A	WO 94 07451 A (PROCTER & GAMBLE) 14 April 1994 see page 17, line 4 - page 21, line 26 see page 23, line 28 - page 24, line 25; claim 1; figures ---	1,3,7,8
A	US 5 358 500 A (MUELLER CHRISTINA-SUSANNE ET AL) 25 October 1994 see column 39, line 28 - line 61; figure 14 ---	1
A	GB 2 244 422 A (KAO CORP) 4 December 1991 see page 19, line 24 - line 33; claims; figures 6-8 -----	1,3,4,9

# INTERNATIONAL SEARCH REPORT

Information on patent family members

national Application No

PCT/IB 98/00852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0547497 A	23-06-1993	AU 658245 B	06-04-1995
		AU 2987292 A	24-06-1993
		BR 9204605 A	22-06-1993
		CA 2072675 A	30-12-1993
		DE 69218560 D	30-04-1997
		DE 69218560 T	07-08-1997
		EP 0743052 A	20-11-1996
		ES 2098430 T	01-05-1997
		JP 2533273 B	11-09-1996
		JP 5247701 A	24-09-1993
		MX 9206767 A	01-06-1993
		ZA 9208906 A	13-05-1993
WO 9222274 A	23-12-1992	AT 135190 T	15-03-1996
		AU 671076 B	15-08-1996
		AU 2191292 A	12-01-1993
		BR 9206147 A	15-11-1994
		CA 2103272 A	14-12-1992
		CN 1069648 A	10-03-1993
		CZ 9302740 A	13-04-1994
		DE 69209070 D	18-04-1996
		DE 69209070 T	17-10-1996
		DK 588916 T	01-04-1996
		EP 0588916 A	30-03-1994
		ES 2085019 T	16-05-1996
		FI 935547 A	27-01-1994
		GR 3019693 T	31-07-1996
		HU 67984 A	29-05-1995
		IE 75059 B	27-08-1997
		JP 6508282 T	22-09-1994
		MX 9202829 A	01-08-1993
		NO 934556 A	14-02-1994
		NZ 243117 A	24-02-1997
		PL 170288 B	29-11-1996
		PT 8526 U	26-02-1993
		PT 101758 A	31-01-1996
		SK 141493 A	07-12-1994
		US 5242436 A	07-09-1993
WO 9519753 A	27-07-1995	AU 1832095 A	08-08-1995



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 98/00852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9519753 A		EP 0740541 A JP 9508035 T US H1674 H	06-11-1996 19-08-1997 05-08-1997
EP 0487921 A	03-06-1992	JP 4166150 A JP 7044945 B JP 4364845 A DE 69113213 D US 5449353 A US 5415649 A	12-06-1992 17-05-1995 17-12-1992 26-10-1995 12-09-1995 16-05-1995
EP 0761194 A	12-03-1997	JP 9056746 A JP 9056747 A AU 6219896 A CA 2184039 A	04-03-1997 04-03-1997 27-02-1997 26-02-1997
WO 9407451 A	14-04-1994	US 5368584 A AU 688275 B AU 4928093 A CA 2143933 A CN 1088425 A CZ 9500757 A EG 20124 A EP 0662812 A FI 951405 A HU 72149 A JP 8502182 T MX 9305942 A NO 951107 A NZ 256332 A	29-11-1994 12-03-1998 26-04-1994 14-04-1994 29-06-1994 12-07-1995 31-07-1997 19-07-1995 24-03-1995 28-03-1996 12-03-1996 29-04-1994 05-04-1995 26-05-1997
US 5358500 A	25-10-1994	AU 692782 B AU 7095994 A BR 9406785 A CA 2163738 A CN 1140984 A CZ 9503189 A EP 0701426 A FI 955787 A HU 73117 A	18-06-1998 03-01-1995 30-01-1996 22-12-1994 22-01-1997 13-11-1996 20-03-1996 01-02-1996 28-06-1996

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 98/00852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5358500 A		JP 8510942 T	19-11-1996
		NO 954866 A	02-02-1996
		WO 9428842 A	22-12-1994
		US 5634916 A	03-06-1997
		US 5643242 A	01-07-1997
		US 5669897 A	23-09-1997
GB 2244422 A	04-12-1991	JP 4035663 A	06-02-1992
		HK 105994 A	14-10-1994
		US 5370634 A	06-12-1994